plasma, or whole blood can be used as specimens. Extracts of patient exudates or fluids have also been successfully used.

The assay uses GBP-protein A bound to colloidal gold as a detection reagent. Samples contain or lacking IgG are placed on the absorption pad, and flow with the protein A conjugate. The presence of antibody in the test solution interferes with protein A binding to the IgG test strip, but develops a band at the anti-protein A control strip. In the absence of antibody protein A binds the IgG strip, and a band is visible. Streptavidin-GBP is used in similar fashion with biotinylated targets.

Claims

1. A DNA plasmid encoding a fusion protein comprising all of, or a combination of the following components;

   a gold-binding polypeptide (GBP) that can have 1 to 7 repeats of the amino acid sequence: Met-His-Gly-Lys-Thr-Gln-Ala-Thr-Ser-Gly-Thr-Ile-Gln-Ser, wherein the last repeat can have an isoleucine substituted for a threonine in the fifth position; or

   a gold-binding peptide with a different amino acid sequence;

   one or more polypeptide fusion partners conferring specific activities to a fusion protein;

   repeating sequences of Gly-Ser of varying length to provide flexible linkers between fusion partners;

   specific affinity-binding sequence such as polyhistidine, or V5 epitope, or FLAG epitope, or the like to facilitate purification of fusion proteins; and

   specific peptide bonds that can be selectively hydrolyzed by enzymes or by chemical reactions.

2. The method of claim 1, wherein the DNA encodes GBP and a polypeptide fusion partner that has specific binding activity for another molecule; said fusion protein configured as polypeptide 1-GBP or GBP-polypeptide 1, and fusion partner domains separated by flexible linking sequences.

3. The method of claim 1, wherein the DNA encodes two or more copies of a distinct polypeptide fusion partner configured as polypeptide 1-GBP-polypeptide 1, and fusion partner domains separated by flexible linking sequences.

4. The method of claim 1, wherein the DNA encodes at least one copy of a distinct fusion partner and one copy of a different fusion partner configured as polypeptide 1- GBP-polypeptide 2 or polypeptide 2-GBP-polypeptide 1, and fusion partner domains separated by flexible linking sequences.

5. The method of claim 2, wherein the DNA encodes protein A, or protein G, or related molecule as a polypeptide fusion partner as in protein A-GBP or GBP-protein A.

6. The method of claim 2, wherein the DNA encodes streptavidin, or avidin, or related molecule as a polypeptide fusion partner as in streptavidin-GBP or GBP-streptavidin.

7. The method of claim 1, wherein the DNA encodes two or more copies of GBP as in GBP-GBP, or GBP-GBP-GBP etc, and the GBP domains are separated by flexible linking sequences.

8. The method of claim 3, wherein the DNA encodes at least one copy of protein A, or protein G, or related molecule fused to the amino-terminus of GBP and at least one other copy of protein A, or protein G, or related molecule fused to the carboxyl-terminus of GBP.

9. The method of claim 3, wherein the DNA encodes at least one copy of streptavidin, or avidin, or related molecule fused to the amino-terminus of GBP and at least one other copy of streptavidin, or avidin, or related molecule fused to the carboxyl-terminus of GBP.

10. The method of claim 4, wherein the DNA encodes at least one copy of protein A, or protein G, or related molecule and one copy of streptavidin, or avidin, or related molecule as polypeptide fusion partners as in protein A-GBP-streptavidin or streptavidin-GBP-protein A.

11. The method of claim 1, wherein the DNA encodes polypeptide fusion partners that are enzymes.

12. The methods of claims 1, 2, 3, and 11, wherein the DNA encodes the enzyme horseradish peroxidase (HRP) or related enzyme as polypeptide fusion partners as in HRP-GBP, or GBP-HRP, or HRP-GBP-HRP.

13. The methods of claims 1, 2, 3 and 11, wherein the DNA encodes the enzyme glucose oxidase (GOD) or related enzyme as polypeptide fusion partners as in GOD-GBP, or GBP-GOD, or GOD-GBP-GOD

14. The methods of claims 1 and 4, wherein the DNA encodes the enzyme horseradish peroxidase (HRP) or related enzyme, and the enzyme glucose oxidase (GOD) or related enzyme as polypeptide fusion partners as in HRP-GBP-GOD, or GOD-GBP-HRP.

15. The methods of claims 1 and 2, wherein the DNA encodes a polypeptide substrate or polypeptide inhibitor of a proteolytic enzyme as a fusion partner.

17. The method of claim 1, wherein the DNA encodes polypeptide fusion partners that are cell surface receptors, or other cell surface proteins, or ligands of cell surface receptors or proteins.

18. A method, wherein the DNA of claims 1 through 17 are expressed in bacteria, yeast, baculovirus, other microorganisms, plant cells, plants, mammalian cells or animals to produce stable and active fusion proteins containing GBP.

19. The method of claim 18, wherein the GBP-containing fusion proteins are purified by conventional means or using a polyhistidine sequence or other affinity tag sequence.

20. The method of claim 19, wherein purified GBP-containing fusion proteins are used in all fields that utilize gold.

21. The method of claim 19, wherein purified GBP-containing fusion proteins are used in biosensor or biodetection applications.

22. The method of claim 19, wherein purified GBP-containing fusion proteins are used to construct surface plasmon resonance sensors.

23. The method of claim 19, wherein purified GBP-containing fusion proteins are used to construct piezoelectric quartz crystal sensors.

24. The method of claim 19, wherein purified GBP-containing fusion proteins are used to construct amperometric electrodes.

25. The method of claim 19, wherein the produced GBP-containing fusion proteins are used in all applications utilizing colloidal gold.